

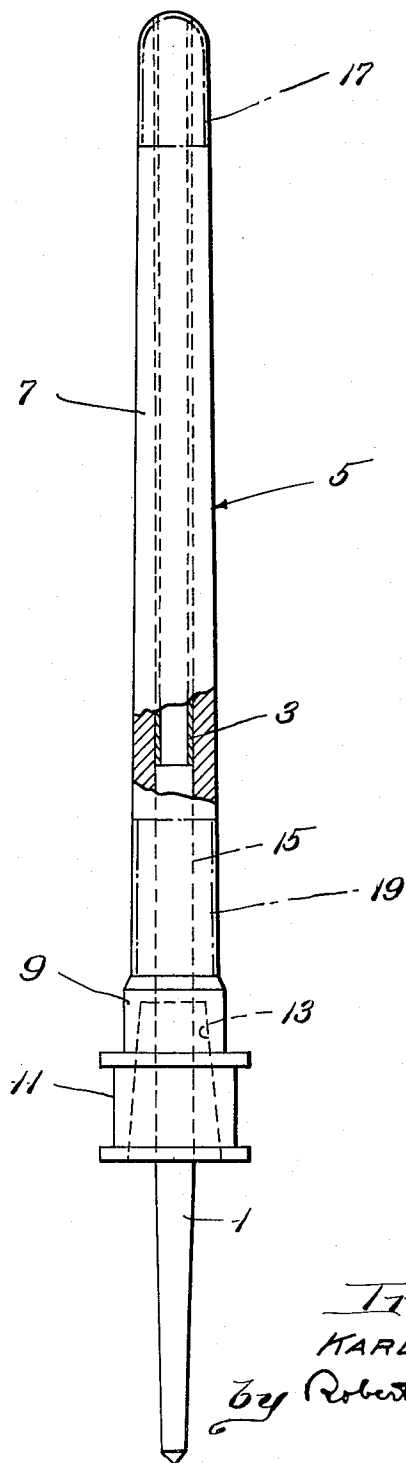
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SPINDLE

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SPINDLE

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1

2

This invention relates to spindles used in spinning and twister frames, and has as its object the provision of a novel and improved spindle having advantages over prior types in the matters of greater useful life through increased resistance to wear and tear, freedom from shrinking, swelling, splitting, chipping, and roughening, ease and economy of construction, improved dynamic balance, lighter weight effecting savings in driving power and in wear of its bearing surfaces, and reduction or absence of slippage between the driving surfaces of the spindle and the bobbin to be driven thereby.

To these ends, the invention comprises a top suspension tube type spindle having an all-metal blade or barrel, with a whorl and acorn preferably made integral therewith, these parts preferably also being made of magnesian metal or other metal of comparable weight for lightness and such metal having its exterior surface wholly or at the parts exposed to greatest wear protected by coatings, inserts, or surface treatments rendering it more resistant to wear, injury, or other deterioration. Economy and simplicity of manufacture are attained through the novel simplified construction and improved method of manufacture set forth in the following description. Improved driving engagement is attained through the increased diameter given to the bobbin-engaging surfaces of the blade or barrel and through shaping the blade or barrel with a gradual straight taper so that as much of the length of the blade surface as may be desired can be brought into driving engagement with the bore surfaces of the bobbin by changing the design of such bore, so as to increase the area of driving surfaces in mutual engagement to any extent desired.

Other objects of the invention, and their manner of attainment, are as set forth hereinafter.

An illustrative embodiment of the invention is shown in the accompanying drawing.

The improved spindle is manufactured in simplified manner by providing a steel running gear 1 comprising the supporting element whereby the spindle is mounted for rotation in its base, and having suitably hardened bearing surfaces, which is placed end to end against and in exact coaxial alignment with a tube 3 of metal, either of steel or magnesian alloy or other light-weight nature, for reduction of weight. The two parts are set

up in this relation in a die or mold (not shown) having its founding space of the shape desired for the particular spindle being made, and a one-piece metallic body 5 of magnesian metal or other light-weight metal is cast about them. Such body preferably comprises the blade 7, the acorn 9, and the whorl 11, all formed integrally as a unitary structure, through appropriate shaping of the die. The acorn 9 and whorl 11 are recessed in usual manner as indicated at 13, the running gear 1 being permanently fixed in the body 5 through inclusion of a substantial portion 15 of the length of its upper end within the body 5 above the recess 13 when the body metal is cast around it. The portion 15 is either cylindrical or angularly or irregularly shaped, as needed to insure its being securely anchored in the body. The metallic tube 3 is left empty, for saving in weight. This use of the tube 3 in connection with the casting method of forming the blade of the spindle with its integral acorn and whorl appendages provides a simple method for producing a hollow blade without drilling or coring, and when a light steel tube is used for the part 3 additional strength is added to the spindle when required.

After the body is cast, its surface, or parts thereof, are protected from deterioration through abrasion, corrosion, or other injury, by several alternative methods, as by spraying with molten steel, chromium, cadmium, or other metals relatively harder than the magnesian metal or other light metal of which the body is formed. Alternatively, these and similar metals relatively harder than the metal used for the body are applied to the surface of the body by electro-plating. Methods employing heat, chemical, pressure, and electrical treatment, separately and in combination, with the result of case-hardening or altering the metallic surface of the body 5 physically and/or chemically to make it more resistant to deterioration or to add desired properties, are also employed and contemplated. Synthetic non-metallic coatings either applied to the surface of the body 5 or formed thereon, as metallic oxides or otherwise, by chemical alteration of the surface of the component metal, are also included. Suitable finishing operations appropriate to the nature of the surface coating employed are thereafter performed on the body. Another form of protection consists in providing previous-

3

ly formed portions of metal harder than the body 5, placed in the die previous to the casting, so that they will be fixed in the desired locations and exposed at the surface of the body 5 when the spindle is cast and finished: an example of thus fixing or embedding wear-resisting elements in the body in the process of casting is shown in the drawing, in which the location of a cap 17 of harder metal protecting the tip of the blade, and of a ferrule 19 of similar nature at the base of the blade, are indicated in dot-and-dash lines.

Any suitable conventional or preferred form of base is employed for mounting the spindle with capacity for rotation upon the spindle rail of the spinning frame.

While I have illustrated and described a certain form in which the invention may be embodied, I am aware that many modifications may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular form shown, or to the details of construction thereof, but what I do claim is:

1. A spindle having in combination a steel running gear, a tube disposed coaxially and end-to-end therewith, and a body of metal relatively lighter than steel cast about the running gear and tube.

2. A spindle having in combination a steel running gear, an empty tube disposed coaxially and end-to-end therewith, and a body of metal relatively lighter than steel cast about the running gear and tube, and forming the blade, acorn, and whorl of the spindle.

3. A spindle having in combination a steel

4

running gear and a magnesian metal body cast around the running gear, the body comprising a bobbin-supporting blade with acorn and whorl integral therewith, and having surfaces of the body shielded against deterioration by a protective coating.

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